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Form PTO 1449 (Modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. 214935US2PCT	SERIAL NO. 09/926,335
LIST OF REFERENCES CITED BY APPLICANT	APPLICANT Hiroyuki FUKADA	
	FILING DATE October 23, 2001	GROUP

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA						
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	AO	WO 2000-02338	01/13/2000	WIPO		
	AP	1225529	08/11/99	CHINA		
	AQ	8-79161	03/22/96	JAPAN (submitting English Abstract only)		
	AR	8-223108	08/30/96	JAPAN (with English Abstract)		X
	AS	9-135215	05/20/97	JAPAN (with English Abstract)		X
	AT	11-220774	08/10/99	JAPAN (with English Abstract)		X
	AU	2000-22665	01/21/2000	JAPAN (with English Abstract)		X
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L3: Entry 2 of 2 File: DWPI Aug 30, 1996

DERWENT-ACC-NO: 1996-449018
DERWENT-WEEK: 199645

TITLE: Fading signal evaluation appts. for mobile communication system - has fading signal evaluation unit that estimates fading signal based on time in which integrating value of computed difference of sampled received signals exceeds predetermined value

PATENT-ASSIGNEE: FUJITSU LTD (FUIT), NTT IDO TSUSHINMO KK (NITE)

PRIORITY-DATA: 1995JP-0024831 (February 14, 1995)

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PATENT-FAMILY:

	PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
☐	JP 08223108 A	August 30, 1996		013	H04B007/26

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 08223108A	February 14, 1995	1995JP-0024831	

INT-CL (IPC): H04 B 7/26; H04 B 17/00

ABSTRACTED-PUB-NO: JP 08223108A
BASIC-ABSTRACT:

The appts. includes a receiver (11) that accepts several signals. A sampling unit (12,13) is provided to sample the levels of the received signals at a predetermined cycle. An differential calculating unit (14,15) computes the difference between the sampled received levels.

An addn. and timing unit (16) integrates the computed differences until the time if the integrating value exceeds a predetermined value. A fading signal evaluation unit (17) estimates a fading signal after the integration.

ADVANTAGE - Precisely detects fading signal since fading signal is estimated based on calculated time which changes delicately according to size of difference. Obtains exact evaluation of moving body speed due accurate estimation of fading signal.

ABSTRACTED-PUB-NO: JP 08223108A
EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.1/12

DERWENT-CLASS: W01 W02
EPI-CODES: W01-B05A1; W02-C03C3A; W02-C03E9; W02-C05A;

PATENT ABSTRACTS OF JAPAN

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(43)Date of publication of application : 30.08.1996

(51)Int.CI. H04B 7/26
H04B 17/00

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N T T IDO TSUSHINMO KK

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NAKAMURA TAKAHARU
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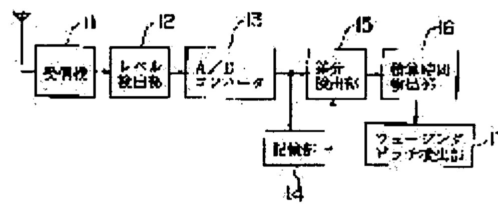
TAKAMI TADAO

(54) FADING PITCH ESTIMATING DEVICE

(57)Abstract:
PURPOSE: To improve the detection precision of the fading pitch with respect to the fading pitch estimating device which detects the reception level variation of a reception signal to estimate the fading pitch in a mobile communication system.
CONSTITUTION: When the fading pitch gets higher, the difference of the reception level is larger, and consequently, the integrated value exceeds a prescribed set value earlier. That is, the time and the fading pitch have correlations that the higher the fading pitch becomes the smaller the time value becomes. The table of correlations between the fading pitch value and the time value is preliminarily obtained by experiment, and a fading pitch detection part 17 uses this correlation table to convert the time value obtained by an integrated time detection part 16 to the fading pitch.



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[Patent number] 2953976

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CLAIMS

[Claim(s)]
[Claim 1] Phasing pitch presumption equipment in migration communication system characterized by providing the following A sampling means to sample receiving level of an input signal a predetermined period A calculus-of-finite-differences appearance means to compute difference between said each sampled receiving level said -- it was computed -- each -- an addition means to integrate difference a time check which finds time amount until a value acquired by [said] integrating exceeds a predetermined value -- a means and a phasing pitch presumption means to presume a phasing pitch based on said found time amount
[Claim 2] it was computed with said calculus-of-finite-differences appearance means -- each -- phasing pitch presumption equipment according to claim 1 characterized by having further a comparison means to send only difference beyond said predetermined threshold for difference to said addition means as compared with a predetermined threshold.
[Claim 3] Said calculus-of-finite-differences appearance means is phasing pitch presumption equipment according to claim 1 which will be characterized by computing difference of said two receiving level if said both two receiving level is said more than predetermined level predetermined level / respectively] about two receiving level continuously sampled with said sampling means.
[Claim 4] Said calculus-of-finite-differences appearance means is phasing pitch presumption equipment according to claim 1 which will be characterized by computing difference of said two receiving level if one [at least] receiving level of the two receiving level continuously sampled with said sampling means is more than predetermined level.
[Claim 5] an average receiving level detection means detect average receiving level of said receiving level -- further -- having -- said phasing pitch presumption means -- said time check -- the phasing pitch presumption equipment according to claim 1 characterized by to presume a phasing pitch based on average receiving level detected with time amount found with a means, and said average receiving level detection means.
[Claim 6] Phasing pitch presumption equipment in migration communication system characterized by providing the following A timing signal generation means to generate two or more kinds of timing signals of a different period Said sampling means to sample two or more receiving level of an input signal based on a timing signal of a class A calculus-of-finite-differences appearance means to compute difference between said each sampled receiving level according to a class of said timing signal said -- it was computed -- each -- a time check which finds time amount until an addition means to integrate difference according to a class of said timing signal, and a value acquired by [said] integrating exceed a predetermined value according to a class of said timing signal -- a means and a phasing pitch presumption means to presume a phasing pitch based on said each found time amount
[Claim 7] said phasing pitch presumption means -- said time check -- phasing pitch presumption equipment according to claim 6 characterized by changing said selected time amount into a phasing pitch with reference to a translation table about a class of timing signal with which either of each time amount found with a means is chosen according to magnitude of each of such time amount, and selected time amount belongs.
[Claim 8] Phasing pitch presumption equipment in migration communication system characterized by providing the following A sampling means to sample receiving level of an input signal a predetermined period A calculus-of-finite-differences appearance means to compute difference of said two receiving level if one [at least] receiving level of the two receiving level continuously sampled with said sampling means is more than predetermined level said -- it was computed -- each -- a comparison means to output a driving signal for difference as compared with a predetermined threshold at the time beyond said predetermined threshold a time check which finds time amount until counted value which a count means for said driving signal to be inputted and to count up for every input of said driving signal, and said count means calculated exceeds a predetermined value -- a means and a phasing pitch presumption means to presume a phasing pitch based on said found time amount
[Claim 9] Said calculus-of-finite-differences appearance means is phasing pitch presumption equipment according to claim 8 which will be characterized by computing difference of said two receiving level if said both two receiving level is said more than predetermined level predetermined level / respectively] about two receiving level continuously sampled with said sampling means.
[Claim 10] an average receiving level detection means detect average receiving level of said receiving level -- further -- having -- said phasing pitch presumption means -- said time check -- the phasing pitch presumption equipment according to claim 8 characterized by to presume a phasing pitch based on average receiving level detected with time amount found with a means, and said average receiving level detection means.
[Claim 11] Phasing pitch presumption equipment in migration communication system characterized by providing the following A timing signal generation means to generate two or more kinds of timing signals of a different period Said sampling means to sample two or more receiving level of an input signal based on a timing signal of a class A calculus-of-finite-differences appearance means to compute difference between said each sampled receiving level according to a class of said timing signal said -- it was computed -- each -- difference with a comparison means to output a driving signal according to a class of said timing signal as compared with a predetermined threshold at the time beyond said predetermined threshold A count means for said driving signal to be inputted and to count up according to a class of said timing signal for every input of said driving signal, a time check which finds time amount until counted value which said count means calculated exceeds a predetermined value according to a class of said timing signal -- a means and a phasing pitch presumption means to presume a phasing pitch based on said each found time amount
[Claim 12] said phasing pitch presumption means -- said time check -- phasing pitch presumption equipment according to claim 11 characterized by changing said selected time amount into a phasing pitch with reference to a translation table about a class of timing signal with which either of each time amount found with a means is chosen according to magnitude of each of such time amount, and selected time

amount belongs.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the phasing pitch presumption equipment which detects the receiving level variation of an input signal and presumes a phasing pitch especially about the phasing pitch presumption equipment in migration communication system. In addition, a "phasing pitch" means phasing frequency on these specifications.
[0002] In recent years, the need over migration communication system increases and many radio frequencies are inevitably needed. However, there is a limit in the radio frequency which can be used. Then, in order to aim at a deployment of a radio frequency, installation of dynamic channel quota control etc. is considered. In dynamic channel quota control, it is necessary to point out playing a role with the important passing speed information on a call, and to ask for the passing speed of a call, and the passing speed of **************. The passing speed of a mobile station is easily computable by detecting a phasing pitch.
[0003]
[Description of the Prior Art] Conventionally, there is "passing speed detection equipment in migration communication system" (international application number PCT-JP 93-01714) for example, by these people as phasing pitch presumption equipment in migration communication system. In such equipment, as shown in drawing 11 , when a receiver 101 receives a transmitted electric wave, detects the receiving level of the input signal by the level detecting element 102 for every timing signal of the predetermined period T and changes into digital value by A/D converter 103 first, a sampling is performed. the difference which built in storage based on the sampled receiving level -- the difference of the receiving level sampled this time and the receiving level sampled last time is searched for by the detecting element 104 at the time of a ** sampling. A comparator 105 makes it count up this difference to a counter 106 as compared with a threshold, when larger than a threshold. A counter 106 performs this count [predetermined time], and a transducer 107 changes it into a phasing pitch based on that counted value, and changes it into the passing speed of a mobile station further. Beforehand, a transducer 107 obtains experimentally the correlation table between this counted value and a phasing pitch, keeps it, and changes with reference to this. And phasing pitch fd Since the relation between the passing speed v of a mobile station expressed with the following type is, the passing speed of a mobile station is computed based on this formula.
[0004] v=fd xlambda (lambda is the wavelength of an input signal)
[0005]
[Problem(s) to be Solved by the Invention] however -- above -- a comparator 105 -- difference -- when larger than a threshold, only one is made to count up the difference called for by the detecting element 104 to a counter 106 as compared with a threshold, for example, 3dBmu, and if the difference is larger than a threshold, only one is made to count up to a counter 106 uniformly That is, even if there 5dBmu Is difference, smaller [than 3dBmu] or the same of the treatment is said of being large. Therefore, there was a trouble that detection precision was low, in the phasing pitch detected with such equipment.
[0006] moreover, difference -- the value of the receiving level which becomes a radical at the time of difference being computed by the detecting element 104 may be very small, and the receiving level in such a case is buried in the noise in many cases. However, since difference was conventionally computed based on such receiving level even when receiving level was very small, there was a trouble that the reliability of the phasing pitch which the computed difference is not necessarily the value which can set reliance, therefore was detected based on such difference was low.
[0007] Moreover, although the value of a phasing pitch was the same, there was a phenomenon in which the counted value obtained with a counter 106 changed with magnitude of received field strength, and there was a problem that detection precision could not be made high, in the conventional phasing pitch detection which does not take received field strength into consideration.
[0008] Furthermore, in above conventional equipment, the detection precision of a phasing pitch may fall depending on the field of a phasing pitch, and the phenomenon of moreover changing according to the magnitude of the predetermined period T of a sampling of the field where such a detection precision is low arises.
[0009] Drawing 12 shows the example of the correlation table between the counted value used by the transducer 107, and a phasing pitch. A curve 108 shows a correlation table in case the predetermined period T of a sampling is 20ms, and a curve 109 shows a correlation table in case the predetermined period T of a sampling is 10ms. the inside of drawing, and a phasing pitch -- a logarithm -- it is expressed with memory.
[0010] As shown in this drawing, with a curve 108, it becomes flat in the field (about 10Hz or more) where a phasing pitch is high, therefore although counted value changed, a phasing pitch seldom changes, but a detection error becomes large as a result. Moreover, with a curve 109, it becomes flat in the field (about 10Hz or less) where a phasing pitch is low, and a detection error becomes large similarly. That is, there was a trouble that the single predetermined period T which covers the field where a phasing pitch is large and can maintain the detection precision of a phasing pitch highly could not be set up.
[0011] This invention is made in view of such a point, and it aims at offering the phasing pitch presumption equipment which aimed at improvement in the detection precision of a phasing pitch.
[0012]
[Means for Solving the Problem] A sampling means to sample receiving level of an input signal a predetermined period as it is shown in drawing 1 in order to attain the above-mentioned purpose in this invention for example, (12 13), A calculus-of-finite-differences appearance means to compute difference between each sampled receiving level (14 15), it was computed -- each -- a time check which finds time amount

until an addition means (16) to integrate difference, and a value acquired by integrating exceed a predetermined value -- with a means (16) Phasing pitch presumption equipment characterized by having a phasing pitch presumption means (17) to presume a phasing pitch based on found time amount is offered.
[0013]
[Function] It is between the time amount of the above [a correlation] and the phasing pitches that the above-mentioned time amount value becomes small, so that a phasing pitch becomes high, since the difference of receiving level will become large, therefore an addition value will exceed the predetermined set point early, if a phasing pitch becomes high.
[0014] therefore -- beforehand -- an experiment -- the correlation table of the value of a phasing pitch, and the above-mentioned time amount value -- obtaining -- a phasing pitch presumption means (17) -- the correlation table -- using -- a time check -- the time amount value acquired with the means (16) is changed into a phasing pitch.
[0015] Since this time amount value is clocked based on difference, it becomes possible [this time amount value changing delicately according to the magnitude of difference, therefore detecting a phasing pitch to high degree of accuracy].
[0016]
[Example] Hereafter, the example of the phasing pitch presumption equipment of this invention is explained based on a drawing.
[0017] Drawing 1 is the block diagram showing the configuration of the 1st example of this invention. Among drawing, when a receiver 11 receives a transmitted electric wave, detects the receiving level of the input signal based on the timing signal of a predetermined period by the level detecting element 12 and changes into digital value by A/D converter 13, a sampling is performed. the receiving level sampled last time holds for every sampling in the storage section 14 -- having -- coming -- **** -- difference -- a detecting element 15 computes the difference of the receiving level sampled this time and the receiving level sampled last time for every sampling, and outputs to the addition time amount detecting element 16. the addition time amount detecting element 16 is sent one by one -- each -- difference is integrated (accumulating totals) and time amount until this addition value exceeds the predetermined set point is clocked.
[0018] It is between the time amount of the above [a correlation] and the phasing pitches that the above-mentioned time amount value becomes small, so that a phasing pitch becomes high, since the difference of receiving level will become large, therefore an addition value will exceed the predetermined set point early, if a phasing pitch becomes high.
[0019] Therefore, beforehand, the correlation table of the value of a phasing pitch and the above-mentioned time amount value is obtained by experiment, and the phasing pitch detecting element 17 changes into a phasing pitch the time amount value acquired by the addition time amount detecting element 16 using the correlation table. In addition, since this time amount value is clocked based on difference, this time amount value becomes possible [changing delicately according to the magnitude of difference, therefore detecting a phasing pitch to high degree of accuracy] here.
[0020] Below, the 2nd example of this invention is explained. Drawing 2 is the block diagram showing the configuration of the 2nd example. Since the configuration of the 2nd example is fundamentally [as the configuration of the 1st example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.
[0021] the 2nd example -- a comparator 18 -- difference -- from the detecting element 15, the difference of the receiving level sampled this time and the receiving level sampled last time was sent at the time of a ** sampling, and the comparator 18 was sent -- each -- it compares with the threshold to which difference was sent from the threshold output section 19. And only the difference beyond a threshold is sent to the addition time amount detecting element 16. in the addition time amount detecting element 16, it was sent one by one from the comparator 18 -- each -- difference is integrated (accumulating totals) and time amount until this addition value exceeds the predetermined set point is clocked.
[0022] That is, when a phasing pitch is high, there is many difference which is beyond thresholds and is sent to the addition time amount detecting element 16, and since the number of the difference which is beyond thresholds decreases when a phasing pitch is low, compared with the 1st example, the difference between a time amount value when a phasing pitch is high, and a time amount value when a phasing pitch is low appears clearly, and becomes detectable [a phasing pitch with a more high precision].
[0023] Below, the 3rd example of this invention is explained. Drawing 3 is the block diagram showing the configuration of the 3rd example. Since the configuration of the 3rd example is fundamentally [as the configuration of the 1st example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.
[0024] the 3rd example -- difference -- the level output section 22 is connected to a detecting element 21 with a leg, and level is supplied with a leg. Level is set as a somewhat larger value than the noise level contained in receiving level with a leg. difference -- a detecting element 21 asks for the difference of the receiving level sampled this time when both last time and this sampling receiving level was more than level about the sampled receiving level as compared with level with a leg with a leg, and the receiving level sampled last time, and sends the difference to the phasing pitch detection processing section 23. the phasing pitch detection processing section 23 consists of the same configuration as the addition time amount detecting element 16 of the 1st example, and the phasing pitch detecting element 17, carries out the same actuation as the case of the 1st example, and is sent one by one -- each -- difference is integrated (accumulating totals), time amount until this addition value exceeds the predetermined set point is clocked, and this time-amount value is changed into a phasing pitch using a correlation table. Detection of a phasing pitch with a more high precision is realized using the difference which can set by this the reliance which is not confused by the noise.
[0025] Drawing 4 is a flow chart which shows the procedure of the processing performed in the 3rd example. Hereafter, it explains along with the step shown in drawing.
[S1] The control variable n of this processing is set as 0.
[0026] [S2] -- the receiving level sampled by the level detecting element 12 and A/D converter 13 sampling a period T -- difference -- it is sent to a detecting element 21 at the time of a ** sampling.
[0027] [S3] The receiving level R (t+nT) sampled last time is compared with level with a leg. Consequently, with [the receiving level R (t+nT)] level [more than] with a leg, it progresses to step S4, and with level [under] with a leg, it progresses to step S6.
[0028] [S4] Receiving level R {t+(n+1) T} sampled this time is compared with level with a leg. Consequently, with [receiving level R {t+(n+1) T}] level [more than] with a leg, it progresses to step S5, and with level [under] with a leg, it progresses to step S6.
[0029] [S5] The difference of the receiving level sampled last time and this time is computed, and it sends to the phasing pitch detection processing section 23. the phasing pitch detection processing section 23 is sent one by one -- each -- difference is integrated (accumulating totals).
[0030] [S6] -- when it is distinguished and exceeded whether the addition value integrated at step S5 exceeded the predetermined set point, while the phasing pitch detection processing section 23 finds time amount until it exceeds and changes this time-amount value into a phasing pitch using a correlation table -- a reset signal -- difference -- it outputs to a detecting element 21, and when it ends and is not over this

processing, it progresses to step S7. difference -- a detecting element 21 will suspend detection of difference, if a reset signal is received.
[0031] [S7] Only 1 increases a control variable n and it prepares for next calculus-of-finite-differences appearance. As mentioned above, since the last time and this sampling receiving level with which the calculus-of-finite-differences appearance in step S5 is presented is more than level with a leg, it can consider that both are the significant values with which such receiving level was clearly distinguished from the noise. Since difference is detected based on such receiving level, difference serves as a value which can set reliance.
[0032] in addition, difference -- the difference which the detecting element 21 showed to drawing 4 -- the difference shown in following drawing 5 instead of detection -- it may be made to detect. other difference to which drawing 5 may be performed in the configuration of the 3rd example -- it is the flow chart which shows the procedure of detection processing. In this flow chart, steps S11-S12 and steps S15-S17 are the same as steps S1-S2 of the flow chart of drawing 4 , and steps S5-S7 respectively. Therefore, explanation of the same step is omitted and only different steps S13 and S14 are explained.
[0033] [S13] The receiving level R (t+nT) sampled last time is compared with level with a leg. Consequently, with [the receiving level R (t+nT)] level [more than] with a leg, it progresses to step S15, and with level [under] with a leg, it progresses to step S14.
[0034] [S14] Receiving level R {t+(n+1) T} sampled this time is compared with level with a leg. Consequently, with [receiving level R {t+(n+1) T}] level [more than] with a leg, it progresses to step S15, and with level [under] with a leg, it progresses to step S16.
[0035] namely, this difference -- with [at least one side of the receiving level sampled last time and this time] level [more than] with a leg, he is trying to compute difference in detection processing
[0036] Below, the 4th example of this invention is explained. Drawing 6 is the block diagram showing the configuration of the 4th example. Since the configuration of the 4th example is fundamentally [as the configuration of the 1st example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.
[0037] In the 4th example, the sampling value of the receiving level outputted from A/D converter 13 is sent also to an adder unit 25 and the division section 26, equalization of receiving level is performed and average receiving level is sent to the phasing pitch detecting element 27 here.
[0038] For every received field strength, based on plurality and an experiment, in the phasing pitch detecting element 27, the correlation table of the time amount value and phasing pitch which are obtained by the addition time amount detecting element 16 is created beforehand, and is kept to it.
[0039] The phasing pitch detecting element 27 detects a phasing pitch based on the average receiving level sent from the time amount value and the division section 26 which were sent from the addition time amount detecting element 16. That is, the time amount value which chose the correlation table corresponding to the average receiving level sent from the division section 26, and was sent by the addition time amount detecting element 16 from from among two or more correlation tables is changed into a phasing pitch.
[0040] As mentioned above, the detection precision of a phasing pitch improves compared with the equipment which a phasing pitch is detected after also taking average receiving level into consideration, therefore is changed into a phasing pitch using the same correlation table regardless of received field strength like before.
[0041] Below, the 5th example of this invention is explained. Drawing 7 is the block diagram showing the configuration of the 5th example. Since the configuration of the 5th example is fundamentally [as the configuration of the 1st example] the same, the same sign is given to the same component, explanation is omitted, and only a different portion is explained.
[0042] In the 5th example, a timer 30 and the 10ms timer 31 are connected to the level detecting element 12 for 20ms, and each timing signal of 20ms of periods and 10ms of periods is supplied to the level detecting element 12 from each. The level detecting element 12 detects the receiving level of an input signal based on each of these timing signals for 20ms and 10ms, and these detected analog values are changed into digital value by A/D converter 13, respectively, and it completes a sampling.
[0043] each receiving level sampled based on the timing signal for 20ms -- 20ms -- difference -- each receiving level which was sent to a detecting element 32 and the storage section 33, and was sampled based on the timing signal for 10ms -- 10ms -- difference -- it is sent to a detecting element 34 and the storage section 35. The receiving level sampled last time is held each time at the storage section 33 and the storage section 35.
[0044] 20ms -- difference -- a detecting element 32 asks for the difference of the receiving level sampled this time based on the timing signal for 20ms, and the receiving level which was sampled last time and memorized for every sampling. the same -- 10ms -- difference -- a detecting element 34 asks for the difference of the receiving level sampled this time based on the timing signal for 10ms, and the receiving level which was sampled last time and memorized for every sampling.
[0045] 20ms -- difference -- a detecting element 32 sends those called-for difference to the addition time amount detecting element 36. the addition time amount detecting element 36 is sent one by one -- each -- difference is integrated (accumulating totals) and time amount until this addition value exceeds the predetermined set point is clocked. This clocked time amount value is outputted to the phasing pitch detecting element 38. the same -- 10ms -- difference -- the difference asked also for the detecting element 34 is sent to the addition time amount detecting element 37. the addition time amount detecting element 37 is sent one by one -- each -- difference is integrated (accumulating totals) and time amount until this addition value exceeds the predetermined set point is clocked. This clocked time amount value is outputted to the phasing pitch detecting element 38.
[0046] The phasing pitch detecting element 38 changes into a phasing pitch the time amount value sent from the addition time amount detecting element 36 in the time amount value sent from the addition time amount detecting element 36 when the time amount value was under a predetermined value as compared with the predetermined value using the correlation curve based on the timing signal in a cycle of equivalent to the curve 108 of drawing 12] 20ms. If a time amount value is beyond a predetermined value, the time amount value sent from the addition time amount detecting element 37 will be changed into a phasing pitch using the correlation curve based on the timing signal in a cycle of [equivalent to the curve 109 of drawing 12] 10ms. In addition, it becomes the curve to which the correlation curve of a time amount value and a phasing pitch also ****s on the curve 108,109 as shown in drawing 12 .
[0047] As mentioned above, in this phasing pitch transform processing, for example in drawing 12 , a part for the left flank of a curve 108 is used rather than a point P1, and a part for the right flank of a curve 109 is used as a correlation table rather than a point P2. Therefore, since the amount of [used as the detection error of a phasing pitch] flat part does not exist in the correlation table used in this way, respectively, a phasing pitch can be detected with high degree of accuracy.
[0048] Below, the 6th example of this invention is explained. Drawing 8 is the block diagram showing the configuration of the 6th example. Since the configuration of the 6th example is fundamentally [as the configuration of the 1st example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.
[0049] the 6th example -- difference -- the level output section 41 is connected to a detecting element 40 with a leg, and level is supplied with a

leg. Level is set as a somewhat larger value than the noise level contained in receiving level with a leg. difference -- a detecting element 40 asks for the difference of the receiving level sampled this time when both last-time and this sampling receiving level was more than level about the sampled receiving level as compared with level with a leg with a leg, and the receiving level sampled last time, and outputs a driving signal for this difference to a counter 42 as compared with a predetermined threshold (for example, 3dBmu) at the time beyond a predetermined threshold. A counter 42 is counted up for every input of a driving signal, and outputs the counted value to the processing-time detecting element 43.

[0050] When it is supervised and exceeded whether the sent counted value exceeded the predetermined set point, the processing-time detecting element 43 finds time amount until it exceeds, and sends this time amount value to the phasing pitch detecting element 44. it -- a reset signal -- difference -- it outputs to a detecting element 40. difference -- a detecting element 40 will suspend detection of difference, if a reset signal is received.

[0051] As mentioned above, since the last time and this sampling receiving level with which calculus-of-finite-differences appearance is presented is more than level with a leg, it can consider that both are the significant values with which such receiving level was clearly distinguished from the noise. Since difference is detected based on such receiving level, difference serves as a value which can set reliance. Therefore, detection of a phasing pitch with a more high precision is realized using the difference which can set the reliance which is not confused by the noise.

[0052] in addition -- this example -- difference, although he is trying for a detecting element 40 to ask for difference with the receiving level by which both last time and this sampling receiving level was sampled the receiving level sampled this time when it was more than level with a leg, and last time this -- replacing -- difference -- you may make it a detecting element 40 ask for difference with the receiving level by which at least one side of the last time and this sampling receiving level was sampled the receiving level sampled this time when it was more than level with a leg, and last time

[0053] Below, the 7th example of this invention is explained. Drawing 9 is the block diagram showing the configuration of the 7th example. Since the configuration of the 7th example is fundamentally [as the configuration of the 6th example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.

[0054] In the 7th example, the sampling value of the receiving level outputted from A/D converter 13 is sent also to an adder unit 45 and the division section 46, equalization of receiving level is performed and average receiving level is sent to the phasing pitch detecting element 47 here.

[0055] For every received field strength, based on plurality and an experiment, in the phasing pitch detecting element 47, the correlation table of the time amount value and phasing pitch which are obtained by the processing-time detecting element 43 is created beforehand, and is kept to it.

[0056] The phasing pitch detecting element 47 detects a phasing pitch based on the average receiving level sent from the time amount value and the division section 46 which were sent from the processing-time detecting element 43. That is, the time amount value which chose the correlation table corresponding to the average receiving level sent from the division section 46, and was sent by the processing-time detecting element 43 from from among two or more correlation tables is changed into a phasing pitch.

[0057] As mentioned above, the detection precision of a phasing pitch improves compared with the equipment which a phasing pitch is detected after also taking average receiving level into consideration, therefore is changed into a phasing pitch using the same correlation table regardless of received field strength like the 6th example.

[0058] Below, the 8th example of this invention is explained. Drawing 10 is the block diagram showing the configuration of the 8th example. Since the configuration of the 8th example is fundamentally [as the configuration of the 5th example] the same, the same sign is given to the same portion, explanation is omitted, and only a different portion is explained.

[0059] each receiving level sampled in the 8th example based on the timing signal for 20ms -- 20ms -- difference -- each receiving level which was sent to a detecting element 49 and the storage section 51, and was sampled based on the timing signal for 10ms -- 10ms -- difference -- it is sent to a detecting element 54 and the storage section 56. The receiving level sampled last time is held each time at the storage section 51 and the storage section 56, respectively.

[0060] 20ms -- difference -- the level output section 50 is connected to a detecting element 49 with a leg, and level is supplied with a leg. Level is set as a somewhat larger value than the noise level contained in receiving level with a leg. 20ms -- difference -- when both last time and this sampling receiving level is more than level as compared with level with a leg with a leg, a detecting element 49 each receiving level sampled based on the timing signal for 20ms It asks for the difference of the receiving level sampled this time and the receiving level sampled last time, and a driving signal is outputted for this difference to a counter 52 as compared with a predetermined threshold (for example, 3dBmu) at the time beyond a predetermined threshold. A counter 52 is counted up for every input of a driving signal, and outputs the counted value to the processing-time detecting element 53.

[0061] when the processing-time detecting element 53 supervised and exceeds whether the sent counted value exceeded the predetermined set point, while finding time amount until it exceeds and sending this time amount value to the phasing pitch detecting element 59 -- a reset signal -- 20ms -- difference -- it outputs to a detecting element 49. 20ms -- difference -- a detecting element 49 will suspend detection of difference, if a reset signal is received.

[0062] the same -- 10ms -- difference -- the level output section 55 is connected to a detecting element 54 with a leg, and level is supplied with a leg. 10ms -- difference -- when both last time and this sampling receiving level is more than level as compared with level with a leg with a leg, a detecting element 54 each receiving level sampled based on the timing signal for 10ms It asks for the difference of the receiving level sampled this time and the receiving level sampled last time, and a driving signal is outputted for this difference to a counter 57 as compared with a predetermined threshold (for example, 3dBmu) at the time beyond a predetermined threshold. A counter 57 is counted up for every input of a driving signal, and outputs the counted value to the processing-time detecting element 58.

[0063] when the processing-time detecting element 58 supervised and exceeds whether the sent counted value exceeded the predetermined set point, while finding time amount until it exceeds and sending this time amount value to the phasing pitch detecting element 59 -- a reset signal -- 10ms -- difference -- it outputs to a detecting element 54. 10ms -- difference -- a detecting element 54 will suspend detection of difference, if a reset signal is received.

[0064] The phasing pitch detecting element 59 changes into a phasing pitch the time amount value sent from the processing-time detecting element 53 in the time amount value sent from the processing-time detecting element 53 when the time amount value was under a predetermined value as compared with the predetermined value using the correlation curve based on the timing signal in a cycle of [equivalent to the curve 108 of drawing 12] 20ms. If a time amount value is beyond a predetermined value, the time amount value sent from the processing-time detecting element 58 will be changed into a phasing pitch using the correlation curve based on the timing signal in a cycle of

equivalent to the curve 109 of drawing 12] 10ms. In addition, it becomes the curve to which the correlation curve of a time amount value and a phasing pitch also ****s on the curve 108,109 as shown in drawing 12 .
[0065] As mentioned above, in this phasing pitch transform processing, for example in drawing 12 , a part for the left flank of a curve 108 is used rather than a point P1, and a part for the right flank of a curve 109 is used as a correlation table rather than a point P2. Therefore, since the amount of [used as the detection error of a phasing pitch] flat part does not exist in the correlation table used in this way, respectively, a phasing pitch can be detected with high degree of accuracy.
[0066] Moreover, since the last time and this sampling receiving level with which calculus-of-finite-differences appearance is presented is more than level with a leg, it can consider that both are the significant values with which such receiving level was clearly distinguished from the noise. Since difference is detected based on such receiving level, difference serves as a value which can set reliance. Therefore, detection of a phasing pitch with a more high precision is realized using the difference which can set the reliance which is not confused by the noise.
[0067] in addition -- this 8th example -- 20ms -- difference -- a detecting element 49 and 10ms -- difference -- when both last time and this sampling receiving level is more than level with a leg, a detecting element 54 Although he is trying to ask for the difference of the receiving level sampled this time and the receiving level sampled last time this -- replacing -- 20ms -- difference -- a detecting element 49 and 10ms -- difference -- when at least one side of the last time and this sampling receiving level is more than level with a leg, a detecting element 54 You may make it ask for the difference of the receiving level sampled this time and the receiving level sampled last time.
[0068] Moreover, in the 8th example, although the cut-off point level output sections 50 and 55 are formed, there may not necessarily be this no] and may be made a configuration like the 5th example.
[0069]
[Effect of the Invention] As explained above, in this invention, the difference between each sampled receiving level is integrated, the count to which the difference between each receiving level sampled in quest of time amount until the addition value exceeds a predetermined value exceeds a threshold is counted, time amount until the counted value exceeds a predetermined value is found, and a phasing pitch is presumed based on the calculated time amount value. This time amount value becomes possible [changing delicately according to the magnitude of difference, therefore detecting a phasing pitch to high degree of accuracy].
[0070] By becoming detectable [a phasing pitch with a high precision], the place which exact presumption of the passing speed of the mobile which is an important parameter of is attained in migration communication system, therefore contributes to quality improvement of wireless line control or service control serves as size.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the 1st example of this invention.
[Drawing 2] It is the block diagram showing the configuration of the 2nd example.
[Drawing 3] It is the block diagram showing the configuration of the 3rd example.
[Drawing 4] It is the flow chart which shows the procedure of the processing performed in the 3rd example.
[Drawing 5] other difference which may be performed in the configuration of the 3rd example -- it is the flow chart which shows the procedure of detection processing.
[Drawing 6] It is the block diagram showing the configuration of the 4th example.
[Drawing 7] It is the block diagram showing the configuration of the 5th example.
[Drawing 8] It is the block diagram showing the configuration of the 6th example.
[Drawing 9] It is the block diagram showing the configuration of the 7th example.
[Drawing 10] It is the block diagram showing the configuration of the 8th example.
[Drawing 11] It is the block diagram of equipment conventionally.
[Drawing 12] It is drawing showing the example of the correlation table between the counted value used by the transducer, and a phasing pitch.

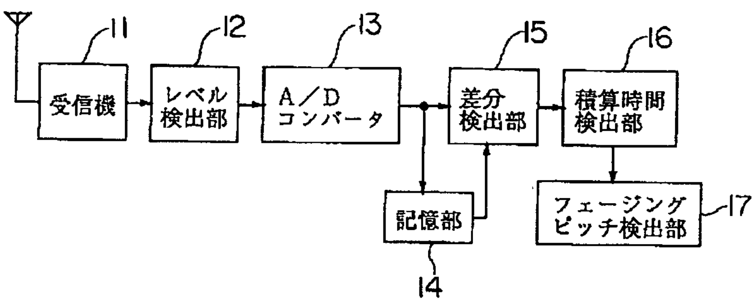
[Description of Notations]
11 Receiver
12 Level Detecting Element (Sampling Means)
13 A/D Converter (Sampling Means)
14 Storage Section (Calculus-of-Finite-Differences Appearance Means)
15 Difference -- Detecting Element (Calculus-of-Finite-Differences Appearance Means)
16 Addition Time Amount Detecting Element (Time Check Addition Means, Means)
17 Phasing Pitch Detecting Element (Phasing Pitch Presumption Means)

[Translation done.]

DRAWINGS

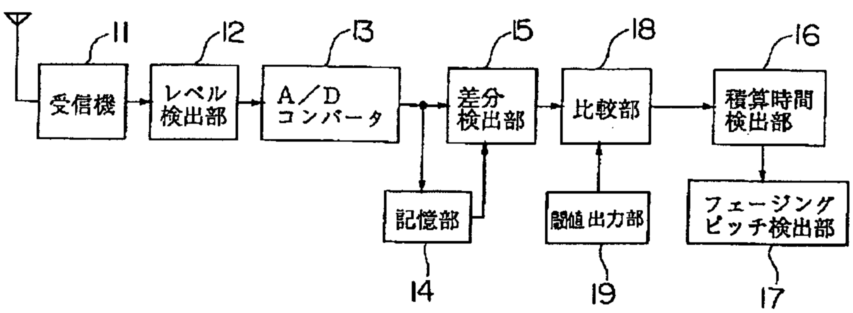
[Drawing 1]

第１の実施例の構成図



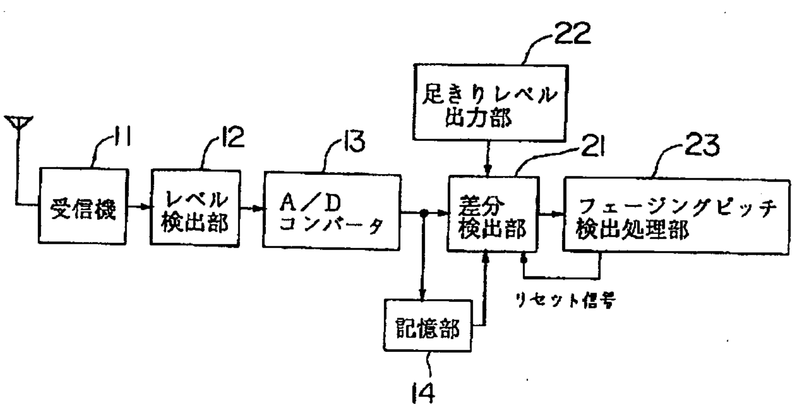
[Drawing 2]

第２の実施例の構成図



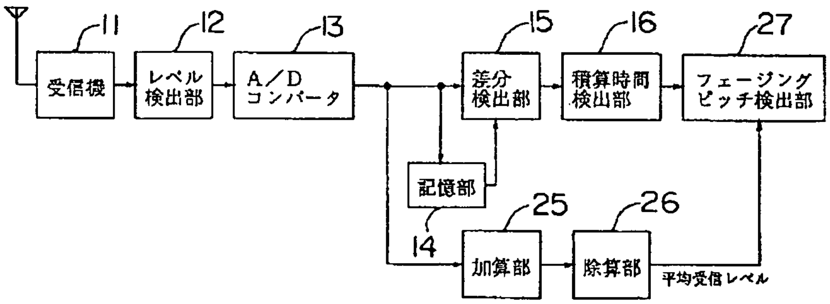
[Drawing 3]

第３の実施例の構成図



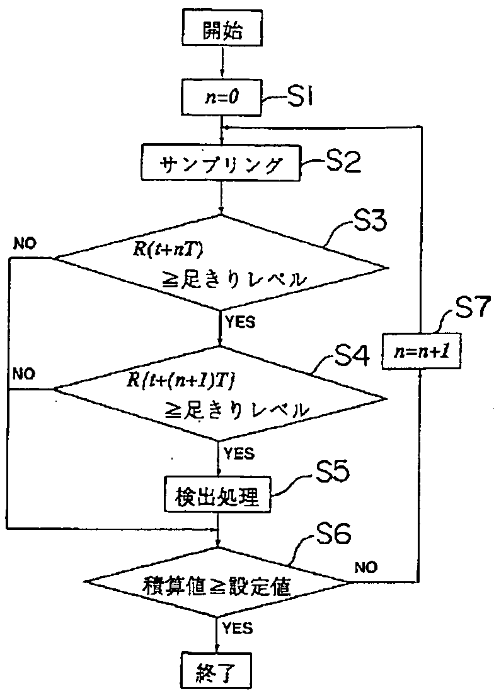
[Drawing 6]

第４の実施例の構成図



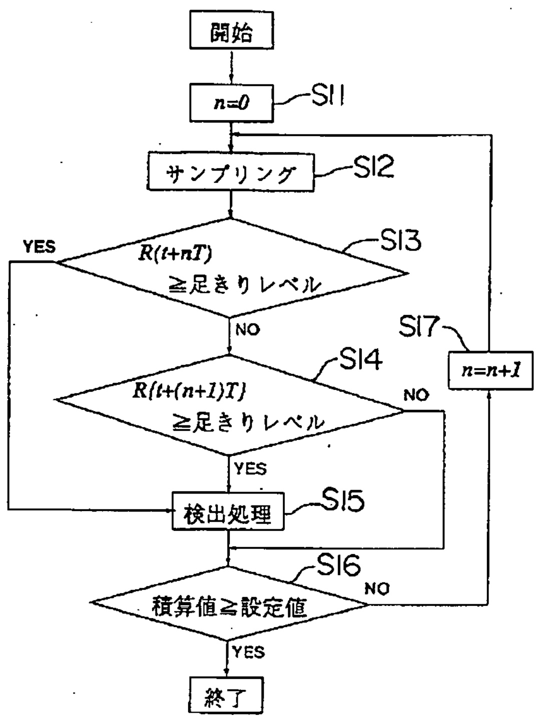
[Drawing 4]

第３の実施例で行われる処理の手順を示すフローチャート



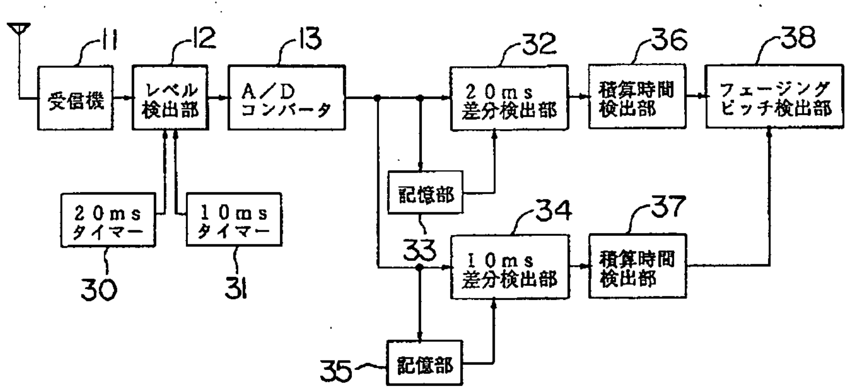
[Drawing 5]

第３の実施例の他の差分検出処理
の手順を示すフローチャート



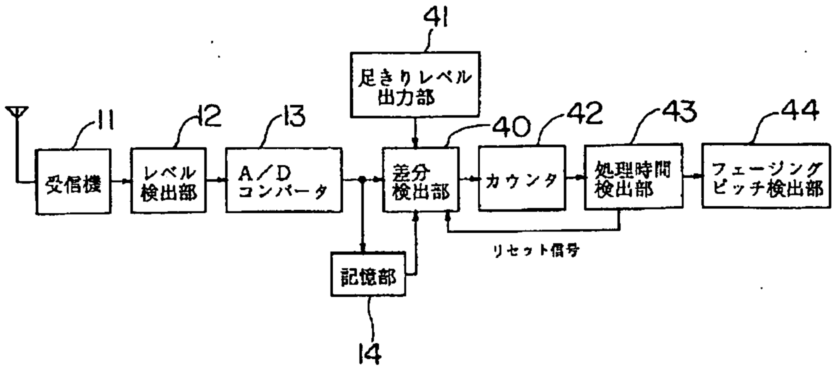
[Drawing 7]

第５の実施例の構成図



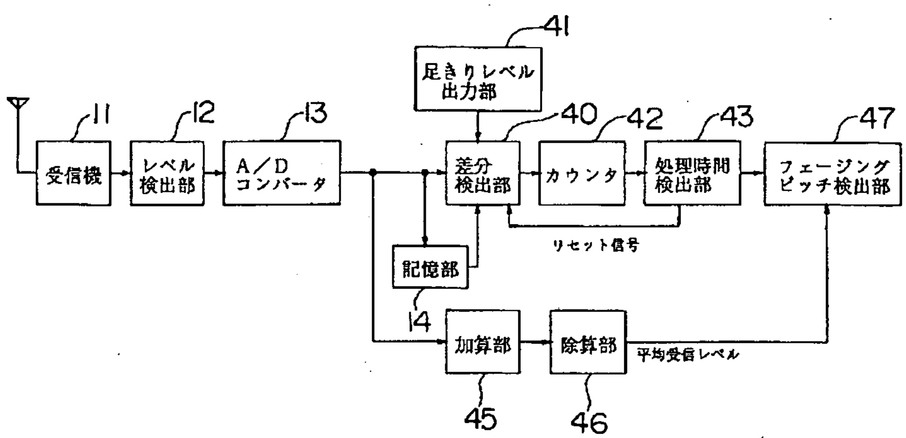
[Drawing 8]

第６の実施例の構成図



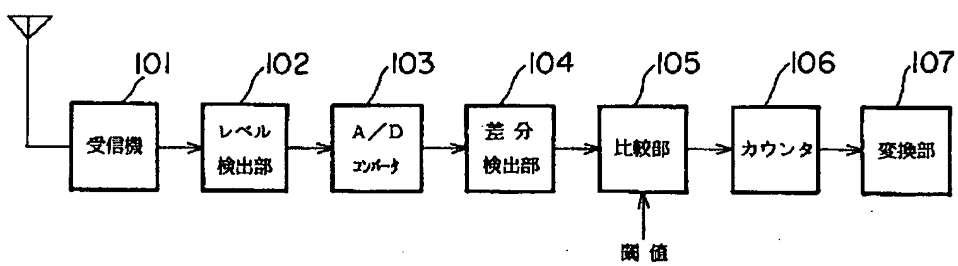
[Drawing 9]

第７の実施例の構成図



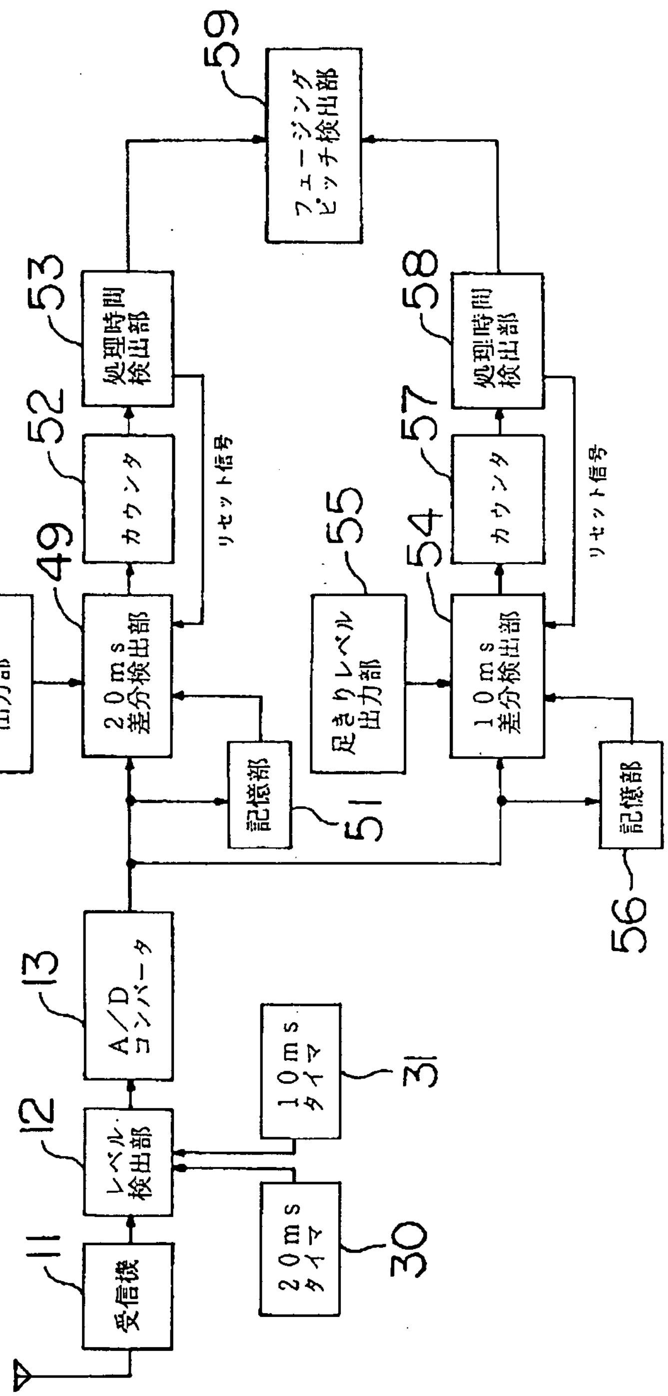
[Drawing 11]

従 来 装 置 の 構 成 図



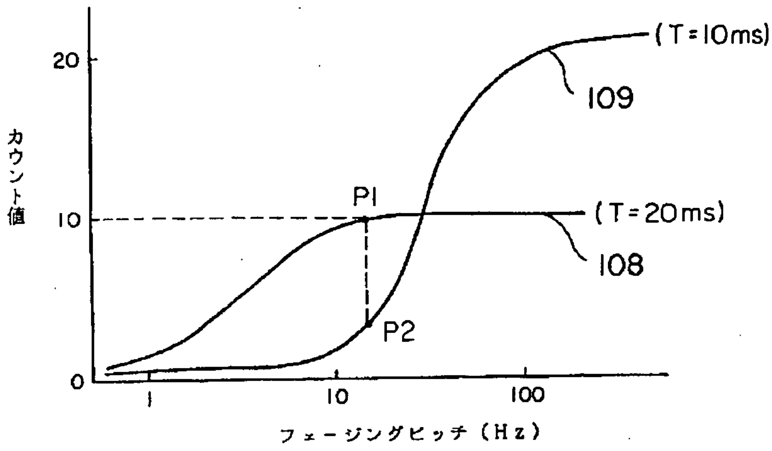
[Drawing 10]

第８の実施例の構成図



[Drawing 12]

カウント値とフェージングピッチとの間の相関テーブル



[Translation done.]